Technical Assessment Letter

Collocation Exclusion

Dear Sirs,

As per 447498 D01 v05, mixed approach in which multiple transmitters are installed into the host within the common enclosure, the evaluation to qualify for simultaneous transmission test exclusion shall be taken into account. This evaluation note is targeted to illustrate the logical reasoning that approved by FCC why Simultaneous SAR transmission can be exempted with the acceptable deduction.

According to 616217 d04 v01 5.3) provision 6," Calculations, analyses and explanations showing how simultaneous transmission RF can be excluded" must be deduced to assure simultaneous transmission due to collocated module shall not generate any concern with respect to RF exposure. Two modules, whose FCCID: PPD-AR5BMD22 as certified XX/XX/201X, and class II proved to be used with the given host, and FCCID: PKRNVWE362 with the intents to be re-assessed due to performance change, are incorporated into host of laptop platform CB001LTE, and the collocated RF exposure concern is raised due to modules are confined in the given host.

As per 447498 D1 v05 section 7.2 while the Σ[(Highest Measured 1g SAR for each portable transmitter), adjusted for maximum tune-up tolerance / 1.6W/Kg)] + Σ [(Highest MPE for each mobile transmitter) / (the corresponding MPE Limit)] < 1, the RF exposure concern generated by incorporation of multiple transmitters can be excluded. Otherwise, issue of collocated RF exposure shall be re-formulated using other proposed mean.

- The [∑ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [∑ of MPE ratios] is ≤ 1.0.
- The SAR to peak location separation ratios of all simultaneous transmitting antenna pairs operating in portable exposure conditions are all ≤ 0.04 and the [∑ of MPE ratios] is ≤ 1.0.

The WLAN transmitter, Qualcomm Atheros, is defined as Portable Transmitter, since the Antenna-to-User distance is 1.46cm < 20cm

The WWAN transmitter, Novatel Wireless Inc, PKRNVWE362, is defined as Mobile Transmitter, since the Antenna-to-User distance is 21.96 cm > 20cm

The following table records the value of calculation:

Data as taken in certified SAR report, FCCID: PPD-AR5BMD22, report #EN/2012/90005, issued by SGS Taiwan Ltd.

	SAR (W/kg)	SAR Limits (W/kg)	SAR / SAR LImits
2Tx	WLAN 802.11b	0.232	0.145
	WLAN 802.11g	0.206	0.12875
	WLAN 802.11n (20M)	0.118	0.07375
	WLAN 802.11n (40M)	0.208	0.13
	WLAN 802.11 a 5.2G	0.14	0.0875
	WLAN 802.11 n (20M) 5.2G	0.098	0.06125
	WLAN 802.11 n (40M) 5.2G	0.599	0.374375
	WLAN 802.11 a 5.5G	0.156	0.0975
	WLAN 802.11 n (20M) 5.5G	0.142	0.08875
	WLAN 802.11 n (40M) 5.5G	**0.765**	**0.478125**
	WLAN 802.11 a 5.8G	0.207	0.129375
	WLAN 802.11 n (20M) 5.8G	0.175	0.109375
	WLAN 802.11 n (40M) 5.8G	0.731	0.456875

- Worst Case is selected due to that there would be only one transmission mode operating at a time while module is being used at the usage of normal condition.
- Power, antenna gain, all required parameter used to determine power density is based on the certified modular report, OY109131542.PKR, issued by PCTEST Lab.

Frequency	779.5 MHz
Limit	0.520 mW/cm^2
Distance (cm), R	20
Power (dBm), P	23.88 dBm (244.00mW)
Tx Ant Gain (dBi), G	**0.8** dBi
Power Density	0.0584723 mW/cm^2
Minimum Distance	20.0 cm
MPE ratio:	0.112447

Frequency	824.2 MHz
Limit	0.549 mW/cm^2
Distance (cm), R	20
Power (dBm), P	31.90 dBm (1549.00mW)
Tx Ant Gain (dBi), G	**-2.5** dBi
Power Density	0.1733606 mW/cm^2

Minimum Distance	20.0 cm
MPE ratio:	**0.315775**

Frequency	1909.8 MHz
Limit	1.000mW/cm^2
Distance (cm), R	20
Power (dBm), P	29dBm (794 mW)
Tx Ant Gain (dBi), G	**0.6** dBi
Power Density	0.1815308 mW/cm^2
Minimum Distance	20.0 cm
MPE Ratio:	0.1815308

Where, Power Density = (Conducted Power + Antenna Gain) * Duty Cycle / (4 π R^2)
MPE Limit = f/ 1500 = 779.5 / 1500 = 0.520 mW/cm^2
MPE Limit = f / 1500 = 824.2 / 1500 = 0.549 mW/cm^2
MPE Limit = 1.0 mW/cm^2

The list of MPE calculation as shown above only reveals the worst-case that generate the highest power density with supported frequency band.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

Σ [(Highest Measured 1g SAR for each portable transmitter, adjusted for maximum tuneup procedure) / 1.6W/Kg)] + Σ [(Highest MPE for each mobile transmitter) / (the corresponding MPE Limit)]

= **0.478125**+ 0.315775 = 0.7939 < 1.0

Therefore, this device complies with RF exposure of simultaneous transmission while mixed modules (mobile (WLAN) and portable transmitter (WWAN)) are incorporated into the host of this give notebook platform.

Willis Chen / Technical Manager
SGS Taiwan Ltd. 134 Wu Kung Road
New Taipei Industrial Park,
Wuku District, New Taipei City, Taiwan
24803, Taiwan